

IX. *On two Gynandromorphous specimens of Cirrochroa Aoris, Doubleday, an Indian species of Nymphalideous Butterflies.* By J. O. WESTWOOD, M.A., F.L.S., &c.

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PLATE II.

THE term Gynandromorphism was first applied by M. Lacordaire to supersede in entomology that of Hermaphroditism, the latter term being more strictly applicable only to those animals in which the generative organs of both sexes are normally included in the same individual, but which, nevertheless, require the presence of a second individual of the same species to effect the joint impregnation of the two individuals. In insects, gynandromorphous specimens, partaking abnormally of the character of both sexes, are generally bilateral; the sexual distinctive characters (which are for the most part in these instances the *secondary* ones) of one sex being exhibited on one side of the body and its organs, and the peculiarities of the opposite sex being seen on the other half of the insect. Of this bilateralism many instances have been recorded, and most extensive collections can boast of the possession of one or more of such "half-and-half" monsters. Here the gynandromorphism may be termed *complete*, but specimens of far greater rarity, in which the abnormality is only *partial* (of which no notice occurs in any of the hitherto published introductions or general works on the science), are now known; and in my *Thesaurus Entomologicus* I collected together a number of instances in which, whilst the body of the insect appears to be unisexual, the partial sexual divarication is confined entirely to the *secondary sexual characters*, exhibited by one or more of the wings only. The peculiar import of this strange modification in a physiological point of view is very difficult to be understood, and from the great rarity of the individuals, and their small size, we can hardly hope to obtain specimens sufficient for the necessary examination of the characters of the primary and internal sexual organs.

The specimens exhibiting this partial gynandromorphism hitherto observed, belong, for the most part, to the Diurnal Lepidoptera, in which the sexual variation in the markings and coloration of the wings quickly catches the eye. Doubtless, however, they are more numerous than has hitherto been supposed. But they are of course liable to be overlooked in the vast multitude of species of all orders where the external sexual distinctions are not conspicuously distinct.

The individuals figured in the 35th plate of my *Thesaurus Entomologicus* (in addition to Mr. George Semper's specimen of *Papilio Pollux* figured in the Wiener Ent. Monatschr. Bd. vii. pl. xix., from India) are *Pieris Pyrrha* in Mr. Hewitson's collection, in which the pair of wings on the left side and the anterior right wing are male, whilst the hind right wing exhibits a mixture of the female brightly-coloured markings, especially towards the outer angle. Several specimens of *Euchloe Cardamines* are figured, in which patches of the male orange colour appear on one of the wings, otherwise female; specimens also of *Anthocharis Evippe*, *Gonepteryx Rhamni*, *Siderone Isidore*, *Hipparchia Semele*, *Morpho Sulkowskyi*, *Polyommatus Adonis*, and *Lasiocampa quercus* are described and figured together with a specimen of *Calepteryx Virgo*, in which the right hand fore wing is irregularly marked with the sexual colours. The specimen of *Hipparchia Semele*, in Mr. F. Bond's cabinet, in size and general appearance, as well as in the structure of the fore legs, is a male insect, but the left fore wing does not exhibit the peculiar rugose portion of the disc (as seen in the male) to its full extent, whilst the apical portion is marked as in the female. Mr. Bond also possesses a male specimen of the same species of butterfly having the apical half of all the wings marked as in the female.

In this species of *Hipparchia* the secondary sexual character of the wings is not confined to the colour or markings, but extends also to the clothing of the wings, the greater portion of the disc of the fore wing being covered with ordinary shaped oval scales, which are affixed to the wing in little cups placed transversely in rows at equal distances apart; but in the rugose portion of the fore wings (characteristic of the male) the membrane of the wing is covered quite irregularly with a vast number of the small cups, the characteristic male scales, or plumules (as they are termed by microscopists), occurring in these parts in vast numbers.

These plumules are either of a very elongated oval form, or are almost linear, with the surface of the scale, however, striated, and the apex terminating in a small tuft of very fine bristles. These scales are implanted in the cups by a minute bulbous base, from which extends a short, extremely slender, cylindrical portion. Although, however, occurring in such vast numbers, these scales are not observed when the insect is at rest, or dried in a cabinet, the roughness which is observed in those parts of the wings being produced by the usual oval scales implanted amongst them, sticking up as if thrust upwards by the dense mass of male plumules beneath.

*Cirrochroa Aoris*, Doubleday and Hewitson Gen. D. Lep. Pl. XXI., fig. 1, is a handsome butterfly belonging to the family Nymphalidæ, inhabiting Assam, Sylhet, and the adjacent parts of India, which was sent to me by Major Jenkins, and of which numerous examples are contained in the British Museum and Oxford collection. The male has the upper side of the wings of an uniform orange colour, with a narrow indistinct oblique stripe across the discoidal cell of the fore wings, followed by an undulated, slightly defined narrow line extending obliquely from the costa of the fore wings to the anal margin of the hind ones; the tip of the fore wings is black, with a submarginal row of lunules, which become nearly obliterated towards the posterior angle, the outer margin being also brown. The hind wings are marked beyond the middle with an oblique row of small round blackish spots, the space between the third branch of the median vein and the discoidal one being without the spot; these are succeeded by two rows of narrow dark lunules parallel with the outer margin, which is also dusky. On the underside the markings are more varied, the ground colour of the wings being paler buff, with a subcentral pearly whitish bar, having an irregular inner and a straight outer margin; the tip of the fore wings is also whitish, the rows of lunules of the upper side being but faintly represented beneath.

The female is much more varied on the upper surface than the male, the ground colour of the wings being ashy buff, with all the markings of the male much darker and better defined, the middle of the wing being traversed by an irregular pale buff band, edged internally with an angulated blackish line; the outer margin of the wing and its markings are also much darker.

Of this species there are two specimens in the British

Museum collection, which exhibit the two varieties of gynandromorphism above described. In one of these specimens the gynandromorphism is exactly bilateral, the wings on the right side of the insect having the colouring and markings of the male strongly defined, whilst the wings on the other left side are those of the female equally strongly marked. The body is small and shrivelled, having the appearance of a male, but the fore leg on the left side is clearly masculine.

The other specimen is clearly a male insect, as it possesses the brushed fore-legs and the slender body of this sex, the wings on the left-hand side being also normally masculine. Those of the right side, on the other hand, exhibit a singular mixture of the characters of the two sexes. On the upper side the fore-wing has the costa, together with a narrow stripe along the fore-margin of the discoidal cell of bright orange, this colour extending to the tip of the wing, the outer posterior angle of which has also broad orange, extending into the space along the apical margin between the second and third branches of the discoidal cell, which space is further marked by two little orange dashes near the base, and a single one beyond its middle. The basal part of the rest of the wing and the middle extending to the central portion of the apical margin is marked as in the female. On the hind-wings the costal portion extending nearly to the discoidal vein is broadly orange, which colour is also seen occupying a large portion of the wing from the middle of the outer margin nearly to the anal angle, extending upwards between the first and second branches of the median vein to the sub-costal row of dark lunules. The remainder of the wing is feminine.

On looking at the insect from beneath, the two right-hand wings are masculine, whilst the fore-wing on the opposite side is almost entirely female, with some longitudinal orange streaks along the costa as above, and some slight orange rather indistinct marks on the external margin. The hind-wing on this side is curiously divided in its colours, the costal portion being broadly masculine, whilst more than half the wing is female.

EXPLANATION OF PLATE II.

- Fig. 1. *Cirrochroa Aoris*, exhibiting partial gynandromorphism of the wings on the right-hand side of the insect, seen from above.
- „ 2. The same specimen, seen from beneath, showing the partial gynandromorphism confined chiefly to the costal area, and towards the anal angle of both fore and hind wings.
- „ 3. *Cirrochroa Aoris*, exhibiting complete gynandromorphism, the wings on the right side being male, and those on the left female; ordinary character of both sexes.